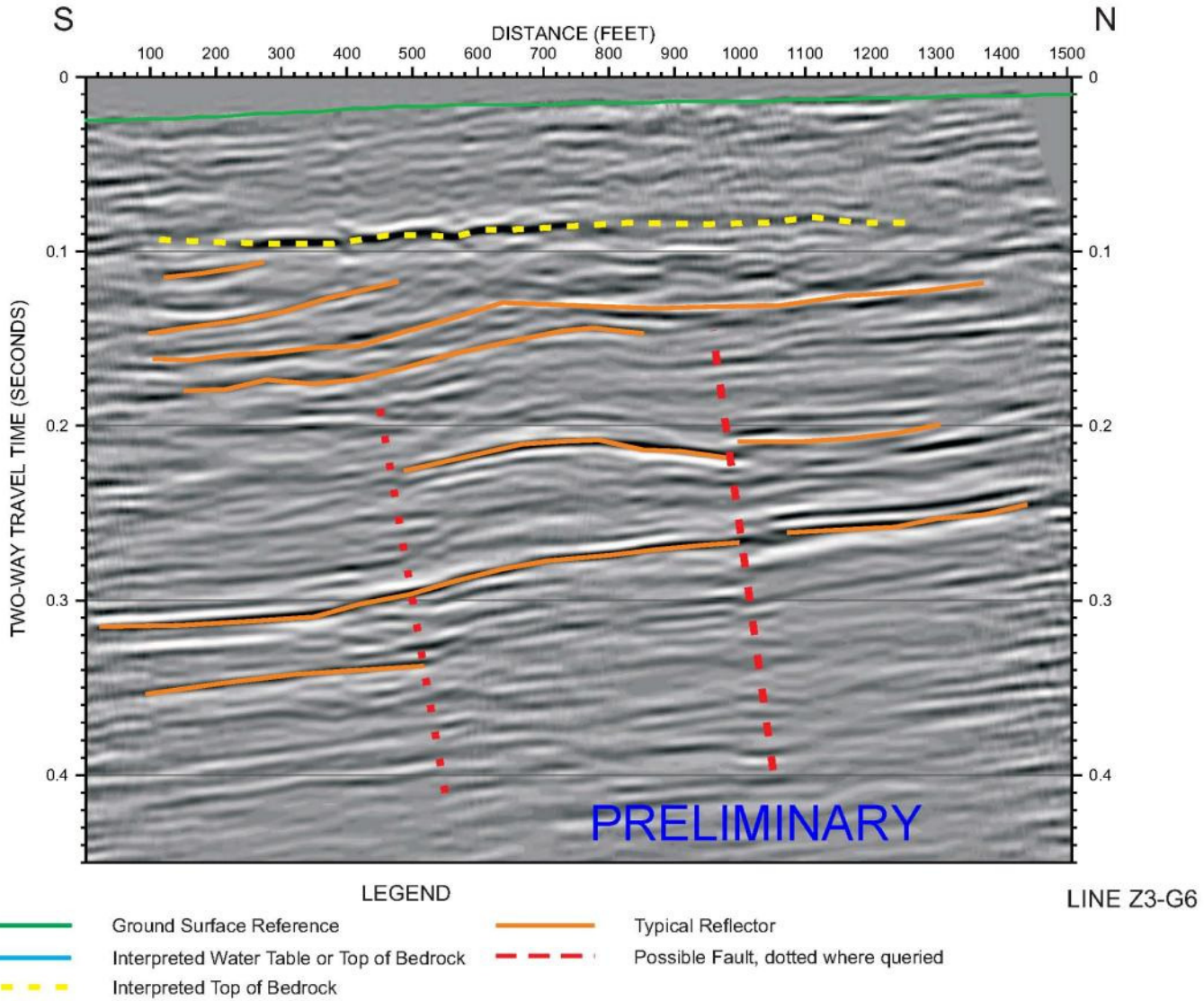
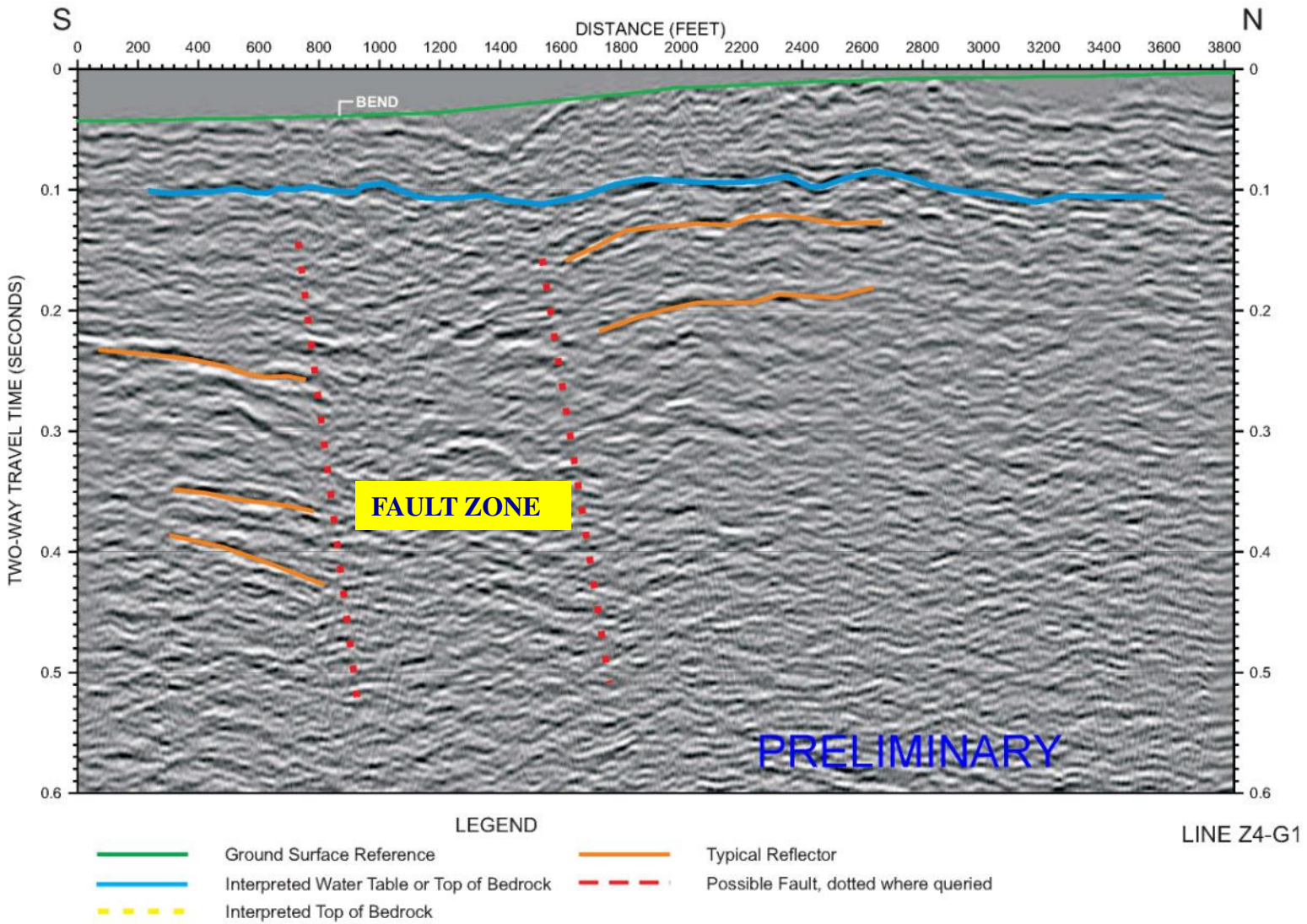
Seismic Reflection Testing
Zone 3 - Highland Park Fault



Seismic Reflection Testing Zone 4 - Raymond Fault



Geotechnical Factors That Affect Tunneling

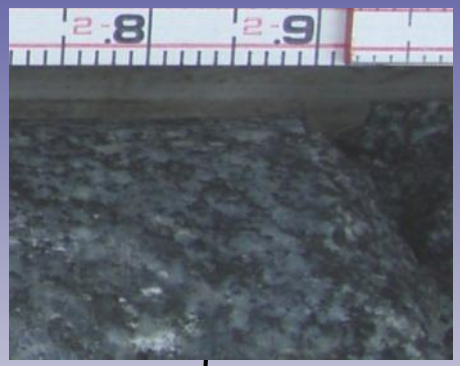
- Type of material (soil or rock)
- Uniformity of geologic units along zone
- Rock/soil strength
- Groundwater conditions
- Major geologic structures (faults, folds, discontinuities, etc.)
- Potential for gassy conditions
- Contaminated soil, rock, and/or groundwater

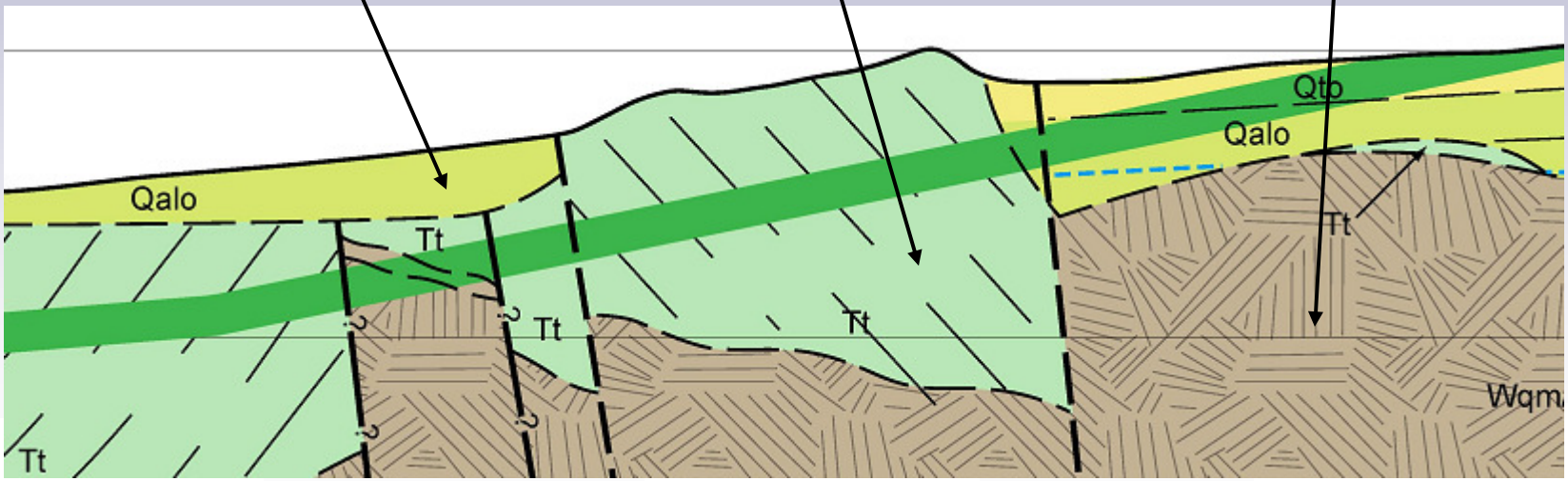
Uniformity of Geologic Units

Soil

Weak (Soft) Rock

Hard Rock





Preliminary Evaluation of Subsurface Conditions

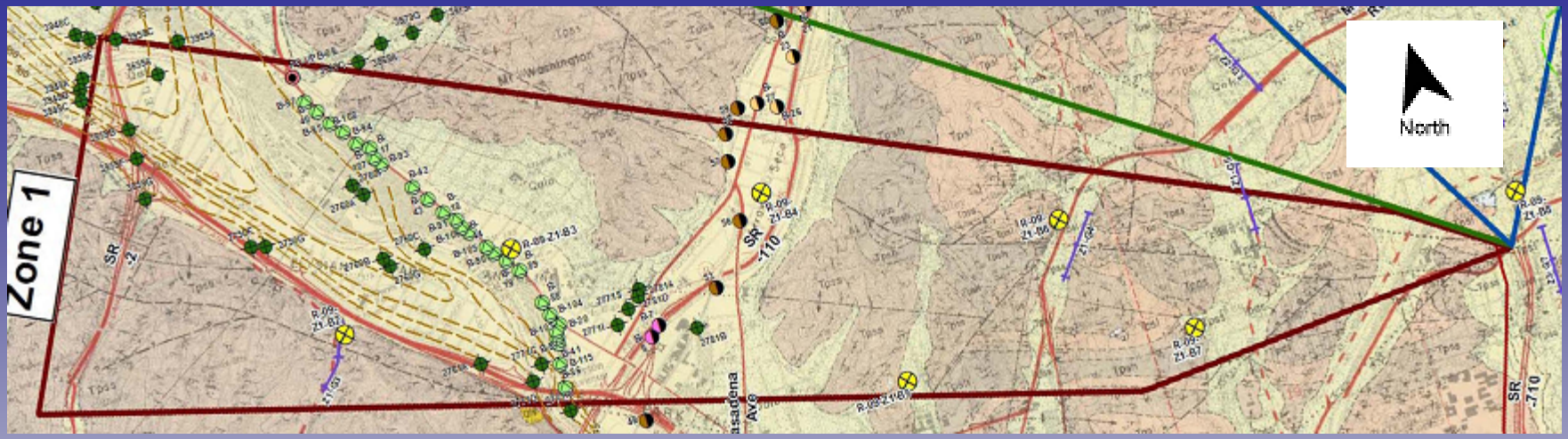
Caltrans

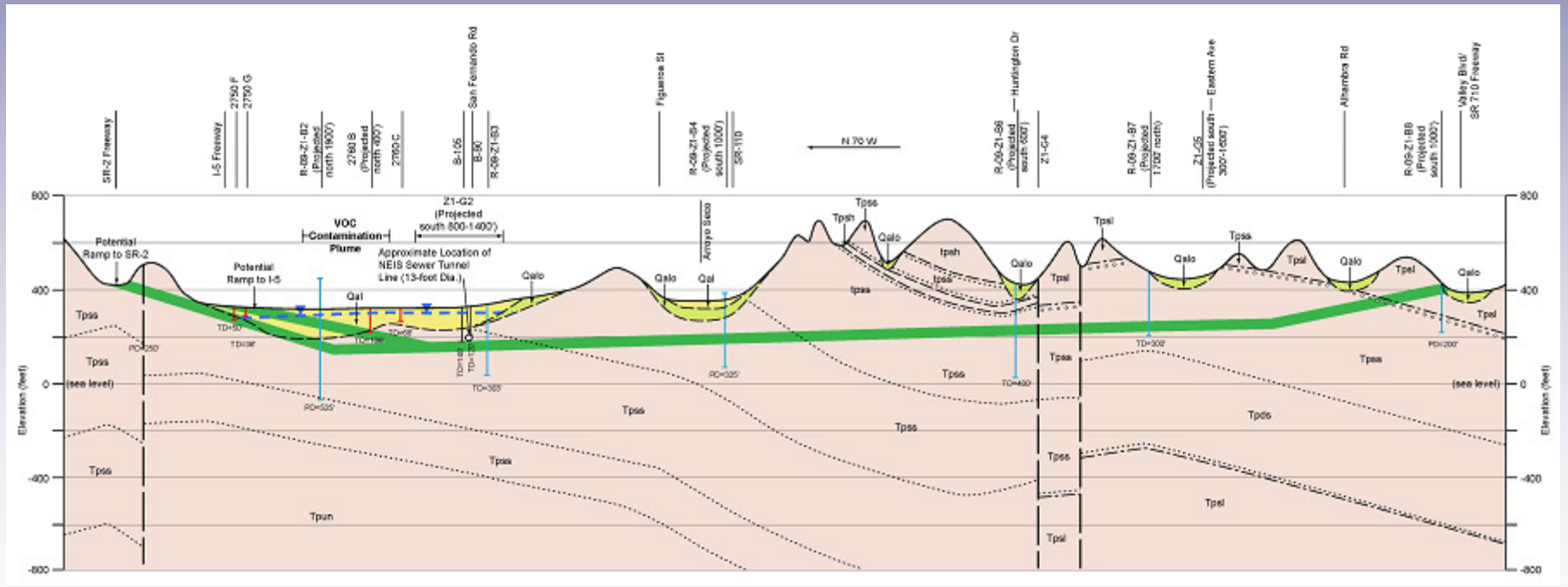
STATE ROUTE 710 TUNNEL TECHNICAL STUDY

Metro

Status of Evaluation

- Currently evaluating all available data:
  - Geologic mapping
  - Drilling program results
  - Available laboratory test results
  - Available geophysical test results
- Preliminary findings discussed



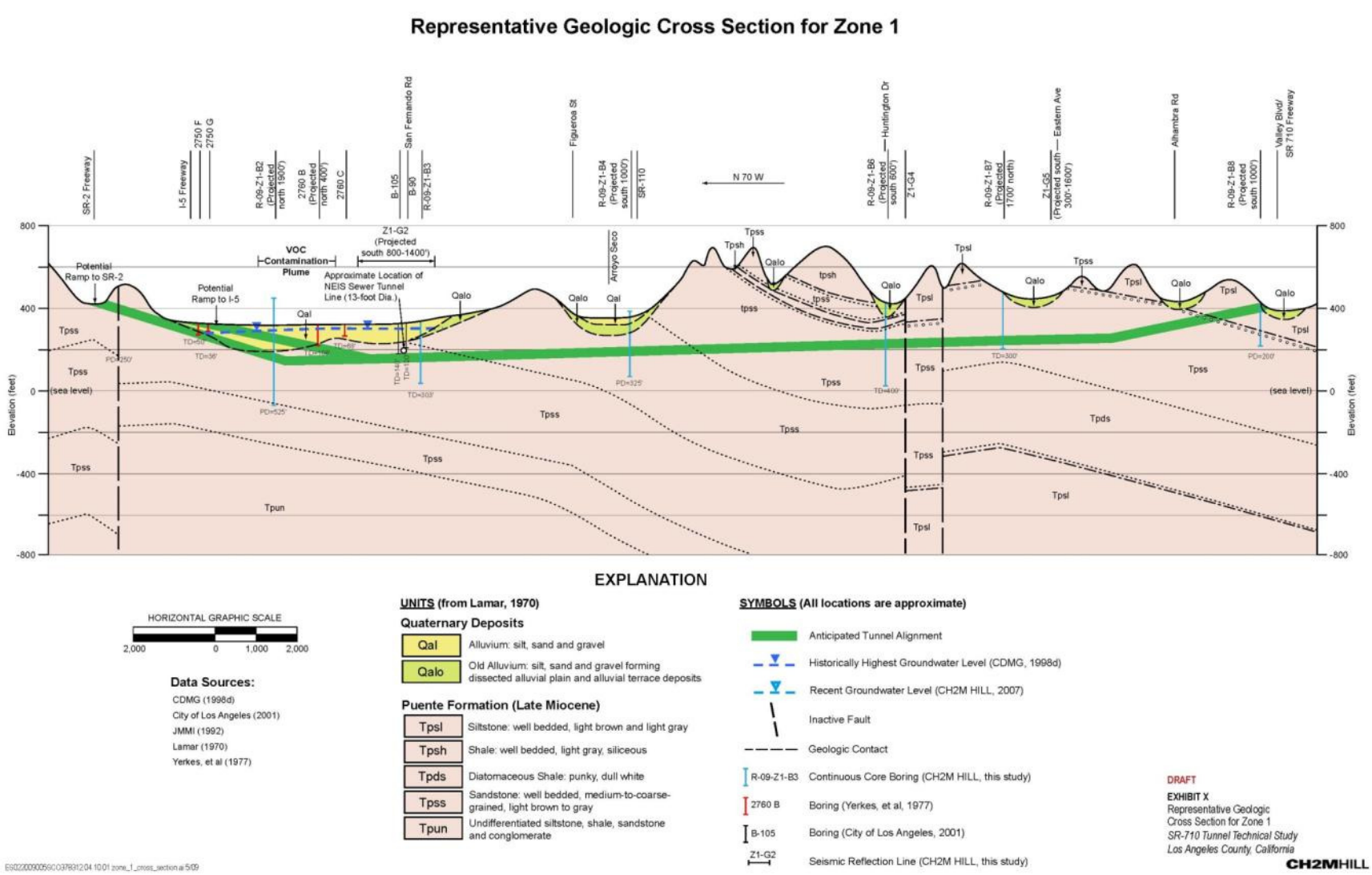


Caltrans

STATE ROUTE 710 TUNNEL TECHNICAL STUDY

Metro

Representative Geologic Cross Section for Zone 1



EXPLANATION

HORIZONTAL GRAPHIC SCALE
2,000 0 1,000 2,000

Data Sources:
CDMG (1998d)
City of Los Angeles (2001)
JMMI (1992)
Lamar (1970)
Yerkes, et al (1977)

UNITS (from Lamar, 1970)

Quaternary Deposits

Qal	Alluvium: silt, sand and gravel
Qalo	Old Alluvium: silt, sand and gravel forming dissected alluvial plain and alluvial terrace deposits

Puente Formation (Late Miocene)

Tpsl	Siltstone: well bedded, light brown and light gray
Tpsh	Shale: well bedded, light gray, siliceous
Tpds	Diatomaceous Shale: punky, dull white
Tpss	Sandstone: well bedded, medium-to-coarse-grained, light brown to gray
Tpun	Undifferentiated siltstone, shale, sandstone and conglomerate

SYMBOLS (All locations are approximate)

- Anticipated Tunnel Alignment
- Historically Highest Groundwater Level (CDMG, 1998d)
- Recent Groundwater Level (CH2M HILL, 2007)
- Inactive Fault
- Geologic Contact
- R-09-Z1-B3 — Continuous Core Boring (CH2M HILL, this study)
- 2760 B — Boring (Yerkes, et al, 1977)
- B-105 — Boring (City of Los Angeles, 2001)
- Z1-G2 — Seismic Reflection Line (CH2M HILL, this study)

DRAFT
EXHIBIT X
Representative Geologic Cross Section for Zone 1
SR-710 Tunnel Technical Study
Los Angeles County, California
CH2MHILL

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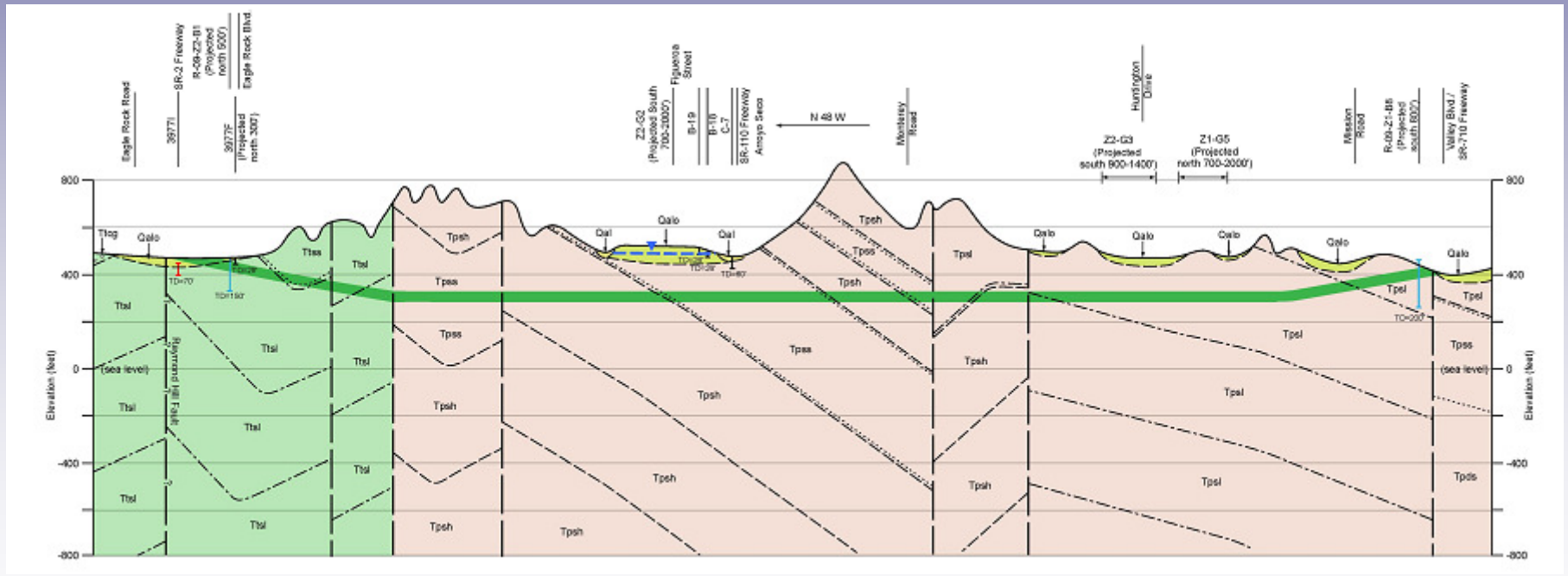
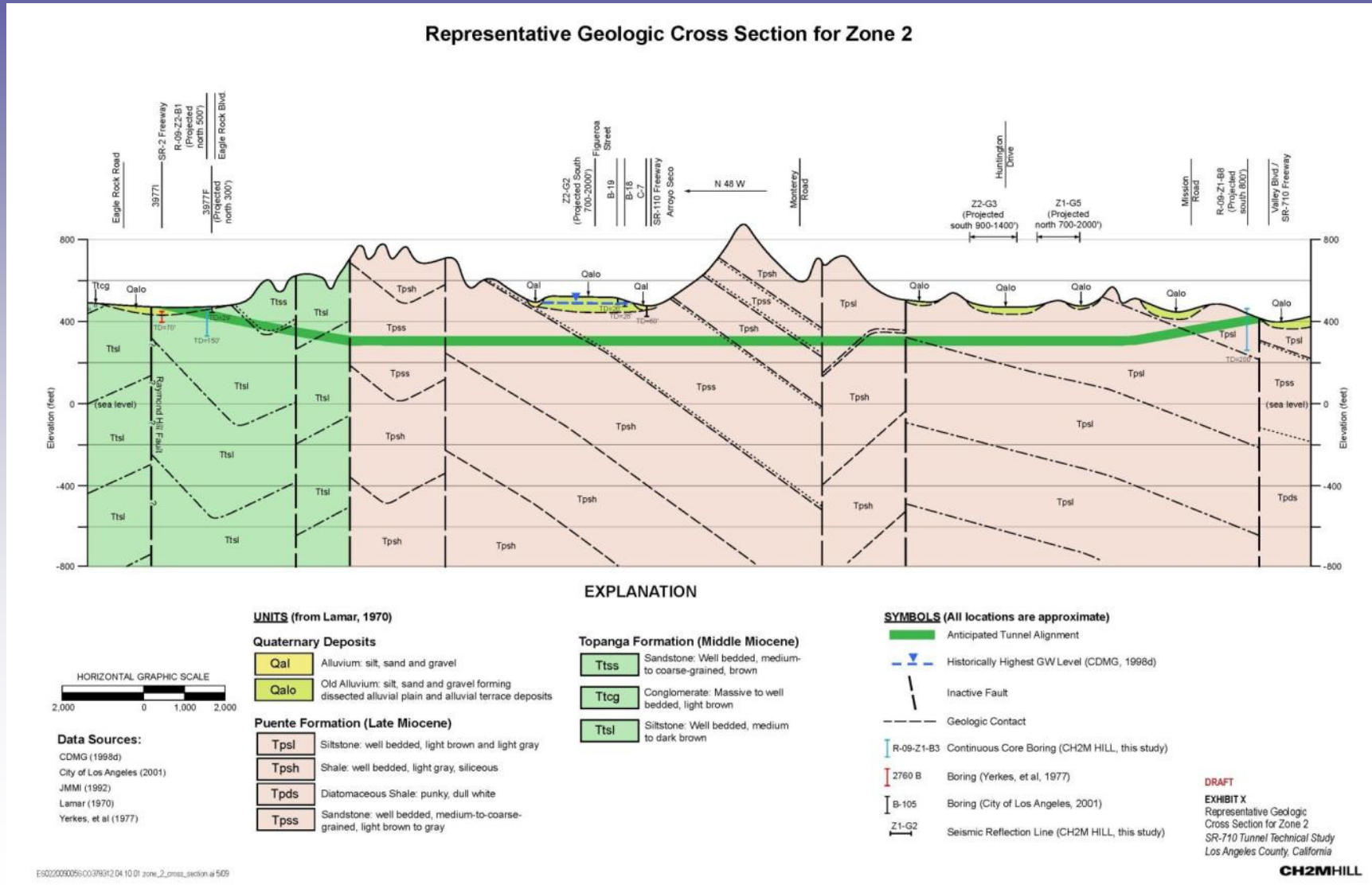
Zone 1 (to SR-2 at I-5)

- Uniform geologic conditions consisting mainly of Puente Formation
  - Weak sandstone with thin siltstone interbeds
- Alluvium has potential for high groundwater inflows
- Several inactive faults within the Zone
- Potential gassy conditions
- Superfund site located in the northwest portion
- Groundwater is approximately 20 to 50 ft below surface


Zone 2
North
Figueroa St
Monterey Rd
Mission Rd

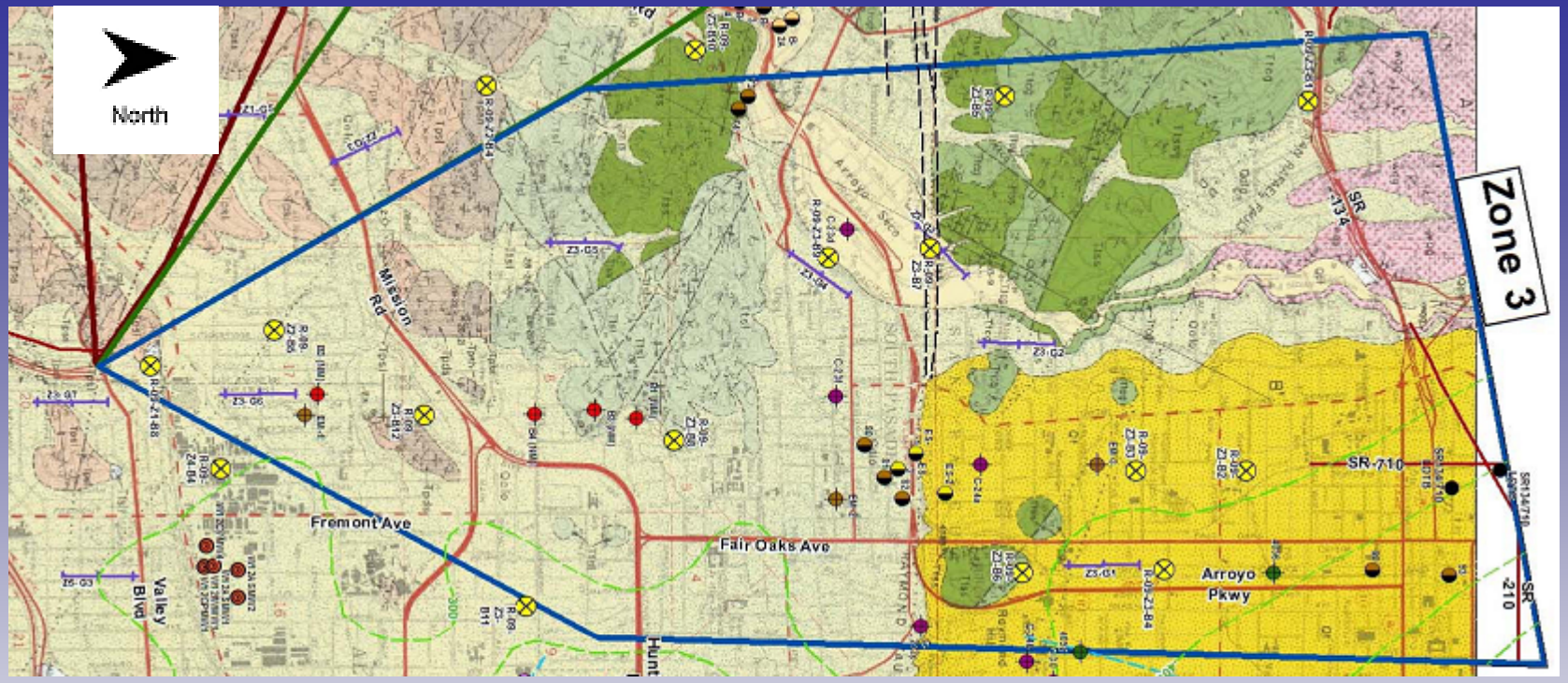

Eagle Rock Road
SR-2 Freeway
Eagle Rock Blvd
Figueroa Street
Monterey Road
Huntington Drive
Mission Road
Valley Blvd./ SR-710 Freeway
N 48 W
Elevation (feet)
(sea level)
Raymond Hill Fault

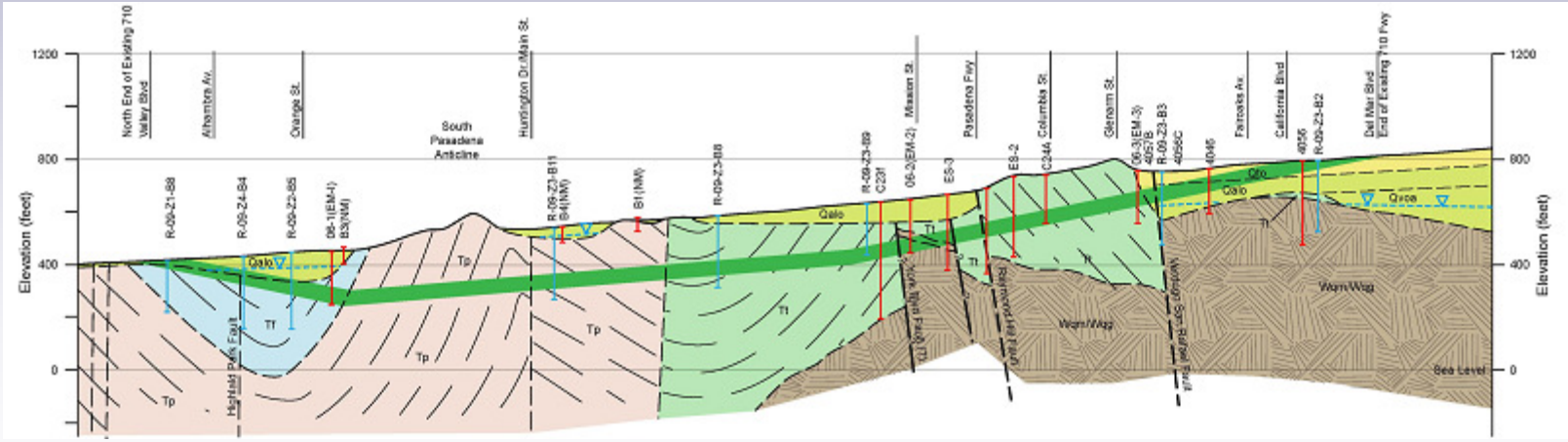
Representative Geologic Cross Section for Zone 2



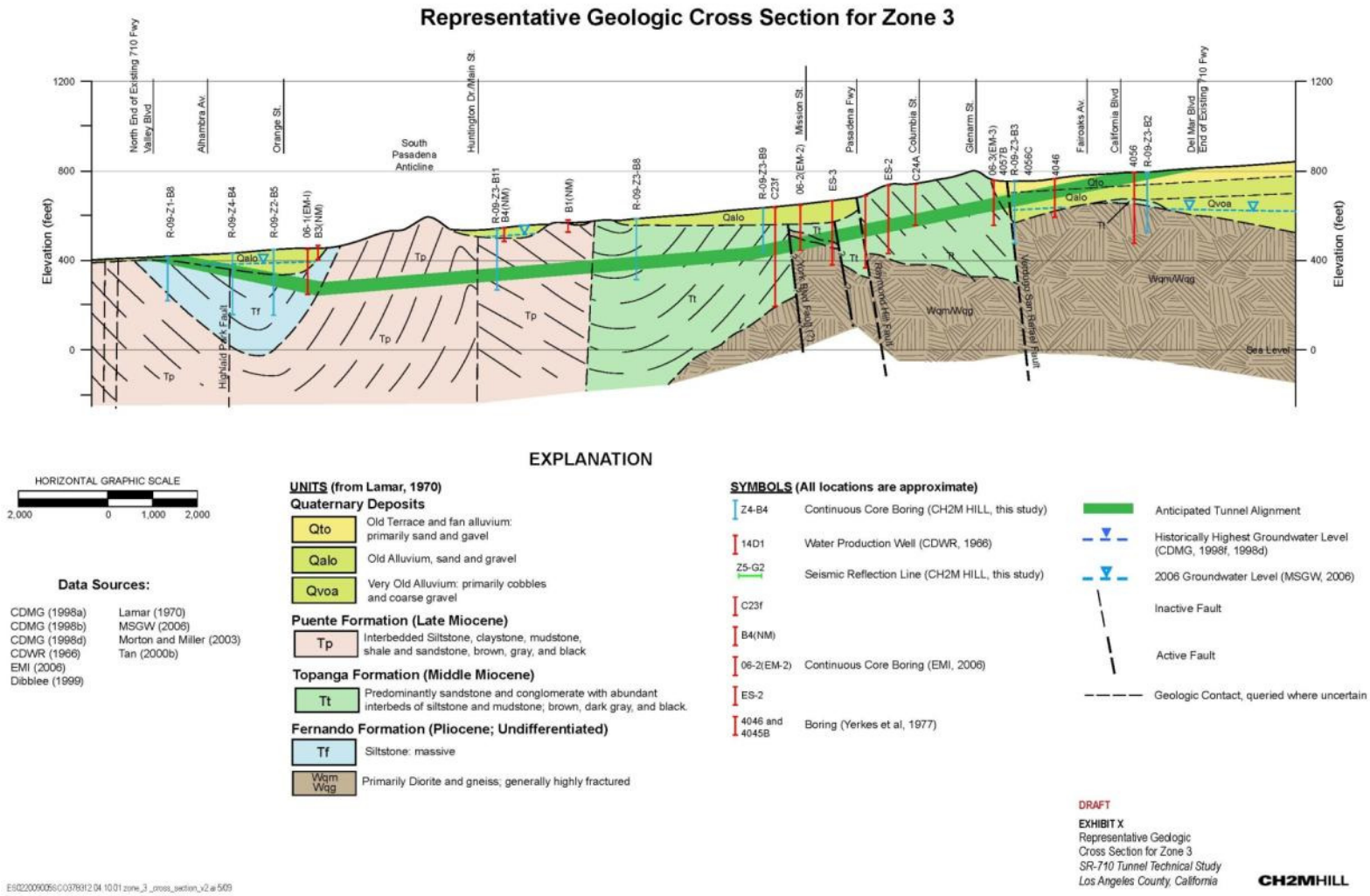
Zone 2 (to SR-2)

- Topanga and Puente Formations will be encountered
  - Topanga Formation (siltstone, sandstone)
  - Puente Formation (sandstone, siltstone, shale)
- Shallow alluvium at northwest end
- Variable geologic structures
- Several inactive faults within the zone
- Raymond fault crosses near northwest end
- Groundwater is approximately 20 ft below surface


North
Zone 3
Mission Rd
Fremont Ave
Valley Blvd
Fair Oaks Ave
Arroyo Pkwy
SR-710
SR-134
SR-210


Elevation (feet)
1200
800
400
0
North End of Existing 710
Valley Blvd
Alhambra Av.
Orange St.
South Pasadena Anticline
Huntington Dr/Main St.
Mission St.
Pasadena Fwy
Columbia St.
Glenarm St.
Fairoaks Av.
California Blvd
Del Mar Blvd
End of Existing 710 Fwy
Qalo
Qpo
Tp
Tf
Tt
Wam/Wag
Raymond Fault
Hunting Park Fault
Sea Level

Representative Geologic Cross Section for Zone 3



EXPLANATION

HORIZONTAL GRAPHIC SCALE
2,000 0 1,000 2,000

Data Sources:

CDMG (1998a)
CDMG (1998b)
CDMG (1998d)
CDWR (1966)
EMI (2006)
Dibblee (1999)
Lamar (1970)
MSGW (2006)
Morton and Miller (2003)
Tan (2000b)

UNITS (from Lamar, 1970)

Quaternary Deposits

- Qto — Old Terrace and fan alluvium: primarily sand and gavel
- Qalo — Old Alluvium, sand and gravel
- Qvoa — Very Old Alluvium: primarily cobbles and coarse gravel

Puente Formation (Late Miocene)

- Tp — Interbedded Siltstone, claystone, mudstone, shale and sandstone, brown, gray, and black

Topanga Formation (Middle Miocene)

- Tt — Predominantly sandstone and conglomerate with abundant interbeds of siltstone and mudstone; brown, dark gray, and black.

Fernando Formation (Pliocene; Undifferentiated)

- Tf — Siltstone: massive
- Wqm Wqg — Primarily Diorite and gneiss; generally highly fractured

SYMBOLS (All locations are approximate)

- Z4-B4 — Continuous Core Boring (CH2M HILL, this study)
- 14D1 — Water Production Well (CDWR, 1966)
- Z5-G2 — Seismic Reflection Line (CH2M HILL, this study)
- C23f
- B4(NM)
- 06-2(EM-2) — Continuous Core Boring (EMI, 2006)
- ES-2
- 4046 and 4045B — Boring (Yerkes et al, 1977)

- Anticipated Tunnel Alignment
- Historically Highest Groundwater Level (CDMG, 1998f, 1998d)
- 2006 Groundwater Level (MSGW, 2006)
- Inactive Fault
- Active Fault
- Geologic Contact, queried where uncertain

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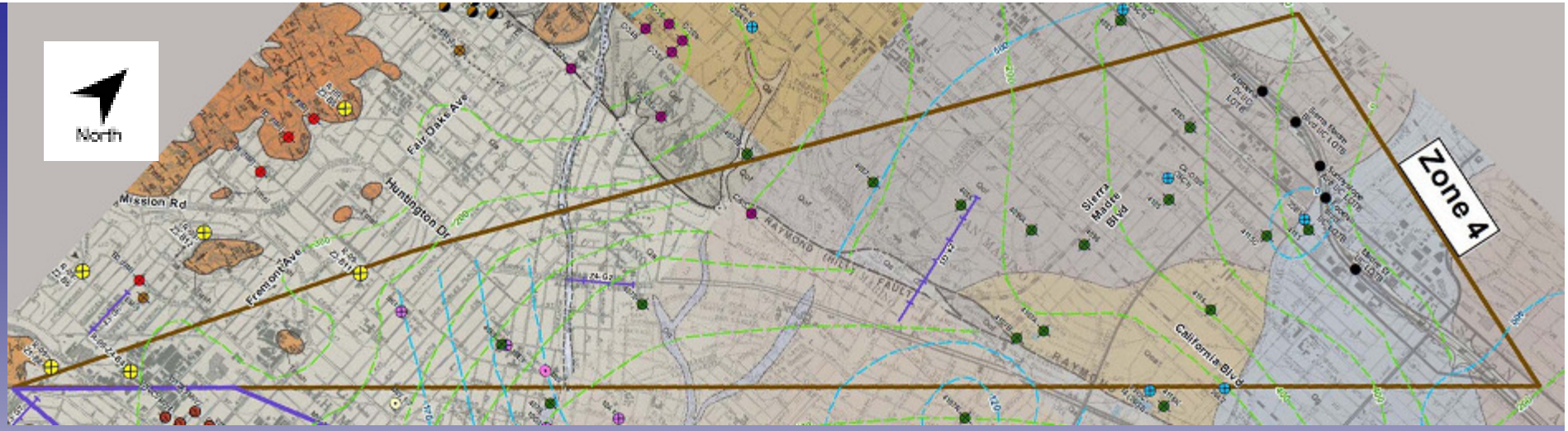
EXHIBIT X
Representative Geologic Cross Section for Zone 3
SR-710 Tunnel Technical Study
Los Angeles County, California

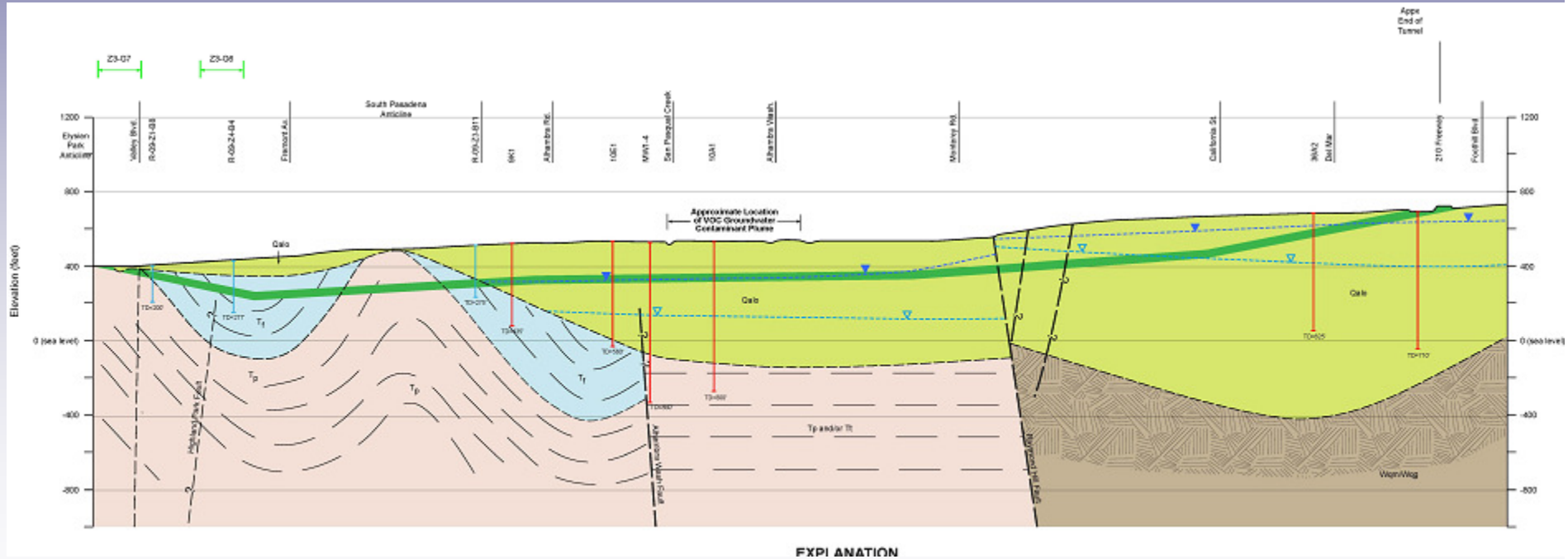
CH2MHILL

ES022009005GCO378912.04.10.01 zone_3 _cross_section_v2.ai 5/09

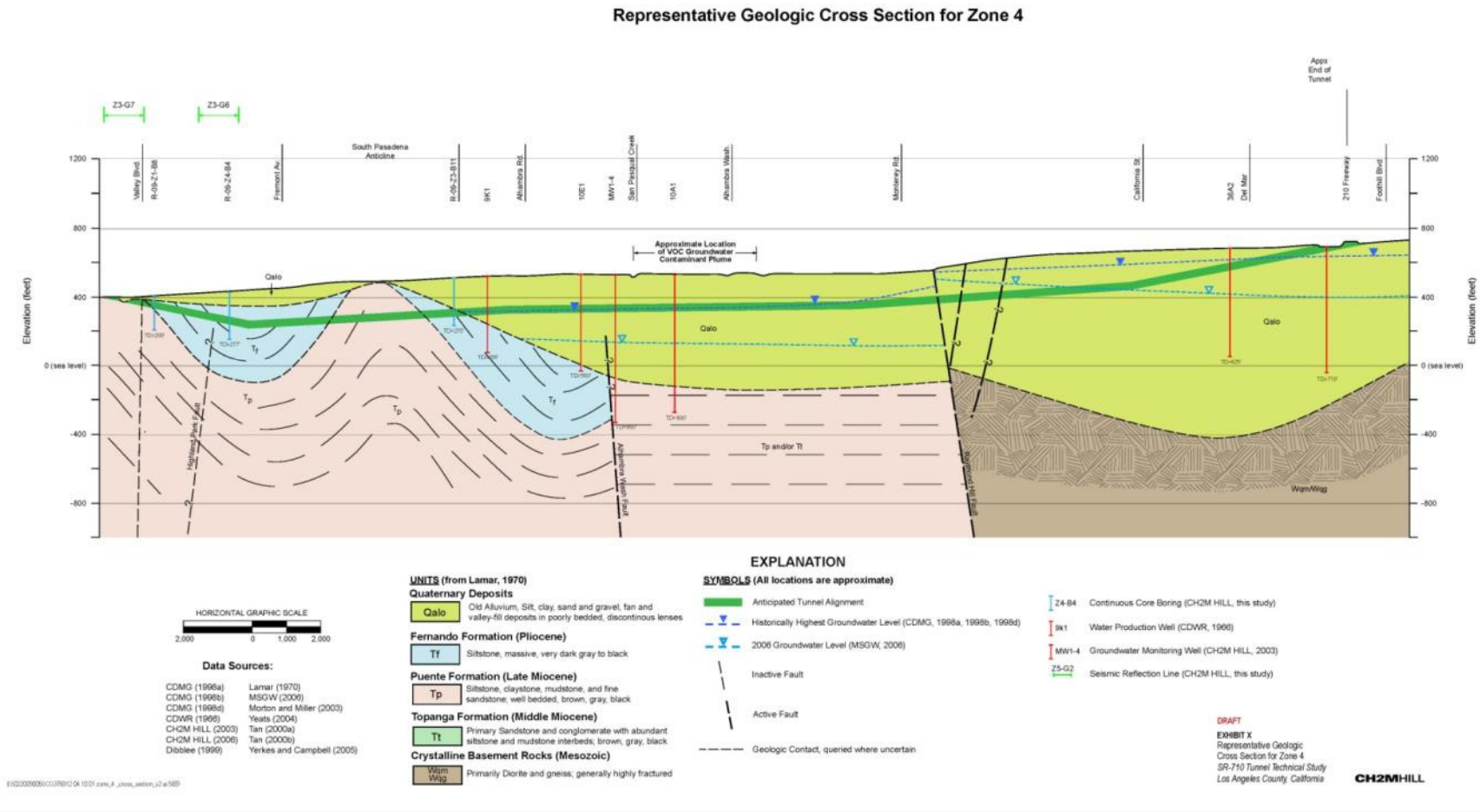
Zone 3 (to I-210 at SR-134)

- Highly variable geologic conditions
  - Alluvium
  - Weak Rock (Fernando, Puente, Topanga Formations)
  - Hard rock (igneous and metamorphic)
- Northern portion of the zone in alluvium
- North of Eagle Rock Fault cobbles and boulders may be encountered
- Highly variable geologic structures (faults, folds, etc)
- Raymond Fault considered active and a groundwater barrier
- Several inactive faults including Eagle Rock fault
- Highly variable groundwater depths


North
Mission Rd
Fair Oaks Ave
Huntington Dr
Fremont Ave
Sierra Madre Blvd
California Blvd
Zone 4


Z3-07
Z3-08
South Pasadena Anticline
Elysian Park Anticline
Valley Blvd
Fremont Av.
Alhambra Rd.
Alhambra Wash
Monterey Rd
California St
Del Mar
210 Freeway
Foothill Blvd
Approximate Location of VOC Groundwater Contaminant Plume
Qalo
Elevation (feet)
0 (sea level)
Tp and/or Tt
Wash/Wag
EXPLANATION

Representative Geologic Cross Section for Zone 4



Zone 4 (to I-210)

- Mostly alluvium with some Fernando and Puente Formation rock near south end
  - Alluvium may contain cobbles and boulders
  - Fernando Formation: mudstone
  - Puente Formation: sandstone, siltstone, and mudstone
- Raymond Fault is considered active and a groundwater barrier
- Potential for high groundwater inflows in alluvium
- Potential for caving soils
- Groundwater levels not uniform across the zone
- Aquitards exist throughout zone
- Groundwater contamination plume at central portion